

National Aeronautics and Space Administration
Launch Services Program presents...

Radiation

Radiation Belt Storm Probes

The Radiation Belt Storm Probes (RBSP) mission is part of NASA's Living with a Star Program. This mission will explore fundamental processes that operate throughout the solar system. RBSP advances our understanding of dramatic and puzzling aspects of Earth's Radiation Belts. The "Van Allen Belts," named for their discoverer, James Van Allen, are two donut-shaped regions encircling the Earth, where high-energy particles that have been energized by interactions with the sun and space are trapped by our planet's magnetic field. The twin RBSP spacecraft will make measurements within the Van Allen Radiation Belts to help us to further understand the Sun's influence on the Earth and near-Earth space by studying the planet's radiation belts on various scales of space and time. RBSP enables the prediction of extreme and dynamic space conditions. Changes in the Sun's energy flow cause changes in Earth's space. These changes are referred to as space weather and have broad impacts on Earth's systems and inhabitants.

RBSP provides understanding needed to design satellites to survive in space. RBSP will explore space weather, and especially its extreme conditions, all of which can impact our way of life as we become increasingly dependent upon the space based infrastructure. Extreme space weather can disable satellites, cause power grid failures, and disrupt Global Positioning System (GPS) services.

The RBSP mission will answer three overarching science questions:

- Which physical processes produce radiation belt enhancement events?
- What are the dominant mechanisms for relativistic electron loss?
- How do ring current and other geomagnetic processes affect radiation belt behavior?

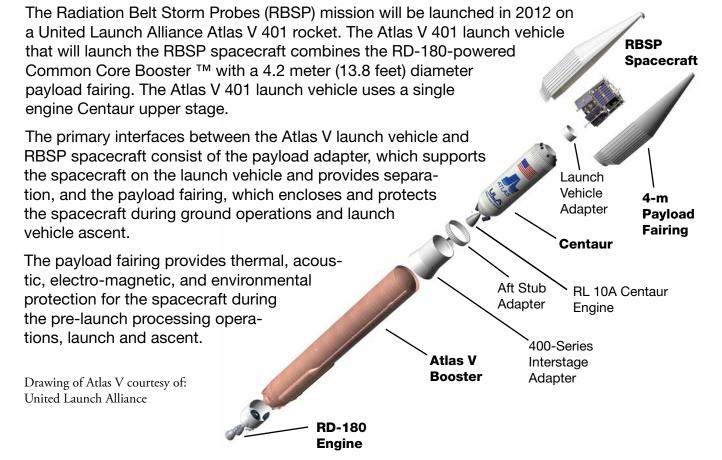
LAUNCH VEHICLE Atlas V-401

Cape Canaveral AirForce Station

LAUNCH DATE 2012

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Radiation Belt Storm Probes (RBSP)



The Applied Physics Laboratory will build and operate the twin RBSP spacecraft for NASA's Living With a Star program.

The RBSP spacecraft will operate entirely within the radiation belts throughout their mission. When intense space weather occurs and the density and energy of particles within the belts increases, the probes will not have the luxury of going into a safe mode, as many other spacecraft must do during storms. The spacecraft engineers must therefore design probes and instruments that are "hardened" to continue working even in the harshest conditions.

The probes will carry a number of instruments and instrument suites to support five experiments that will address the mission's science objectives.

Drawing of RBSP spacecraft courtesy of: National Aeronautics and Space Administration/John Hopkins University Applied Physics Laboratory

